

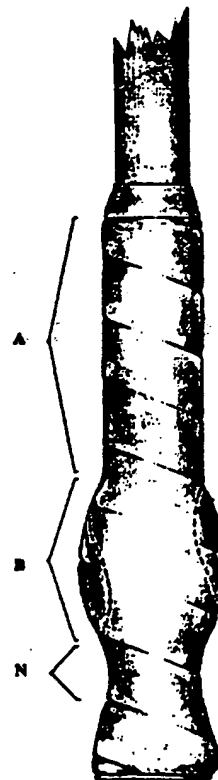


INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/BR97/00004 (22) International Filing Date: 14 February 1997 (14.02.97) (30) Priority Data: PI 9600897-0 15 February 1996 (15.02.96) BR (71)(72) Applicant and Inventor: NOGUEIRA, Bernardo, Andrade [BR/BR]; Sala 402, Rua Ludgero Dolabela, 1021, 30430-130, Belo Horizonte, MG. (BR).		(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i>

(54) Title: ANATOMIC-ISOBARIC HANDLE**(57) Abstract**

The hand grips and/or handles currently in use, employed in sports gear and tooling in general, according to the current state-of-the-art have a non-anatomic shape. The process of the invention described herein presents a new ergonomic object and describes the manufacturing technique for a new hand grip and/or handle furnished with an "anatomic-isobaric body", devised for making the isobaric distribution of the pressure derived from muscle effort all over the human hand, as it holds the hand grip and/or handle. An integral part of this invention is a special single "ring", with technical and functional characteristics identical to those of the "anatomic-isobaric body", adapted to be fit around hand grips and/or handles which furnish equipment currently in use. This new hand grip and/or handle, furnished with an "anatomic-isobaric body", directly manufactured and/or adapted through the utilization of a special single "ring" - similarly anatomic-isobaric - is designed to be used in sports gear and tooling in general, providing their users greater comfort, work power, operational efficiency, balance, safety and, specially, control over strokes and movements when using equipment, and all this with less physical effort exerted on the new hand grip and/or handle.



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DESCRIPTION

ANATOMIC-ISOBARIC HANDLE

This Patent of Invention concerns a type of anatomic-isobaric hand grip and/or handle to be used by technical sectors of the industry of sports gear and tooling in general.

The hand grips and/or handles currently in use and employed in sports gear and tooling in general, in accordance with the current state-of-the-art, has non-anatomic shape, not being molded to fit the typical internal contours of the hand. Such is the case with the racquets currently used for court tennis, squash, paddle, polo and golf clubs, baseball bats, hammers, knives, screw-drivers, etc. ...

In observing the internal face of fingers and the human hand palm when unrestrained, and under no stress, one verifies that the referred set is neither plain nor flat, but noticeably CONCAVE. The so-called "M" described by hand lines (cutaneous hand folds), lies precisely at the bottom of the palm center, surrounded by a set of prominent powerful muscles and by the natural concavity of the fingers.

The most important muscles of the hand are located at the base of the palm: the muscles and flexing tendons of the fingers; on the right, the strong muscles of the thumb: the opponent, the flexors and extensors, as well as the interosseous; finally, on the high left, closing the circle, are the muscles and tendons of the metacarpus phalangeal region, where the other fingers are inserted.

Now, the currently used hand grips and/or handles, whose design has remained basically unaltered for over a century, go against the basic facts of hand anatomy, since they do not correctly conform to an extremely important circumstance of human anatomic position, namely: they do not mold themselves to the anatomy of the palm and finger muscles of the human hand and, therefore, they

reduce the muscle stress area by concentrating pressure on a **few points**.

As a direct consequence of this situation, the hand palm of sports people and workers who, with repetitive movements, make use of equipment furnished with the current hand grip and/or handle, shows the appearance of **blisters** which tend to evolve into **callosities** through repeated handling of that equipment.

Thus, due to a reduced stress area, muscle fatigue ensues, in association with the increased workload all along the arm. This results in substantial reduction of the **CONTROL** of the operator over the instrument, with associated loss of efficiency of strokes and increased risk of accidents and, finally, **reduced productivity with the appearance of early fatigue.**

Such is the state-of-the-art.

If one opens the hand and has an object with appropriate anatomic shape placed on it, and subsequently tightly closes the hand, one will notice that the object is involved **comfortably and safely** by the palm and finger muscles. The shape of the object will perfectly mold itself to the anatomy of the hand palm and fingers, which will be exerting over the object an **evenly distributed pressure** or **ISOBARIC PRESSURE**.

Thus, the invention described herein is a new **"ANATOMIC-ISOBARIC HAND GRIP AND/OR HANDLE"**, characterized by featuring anatomic prominences and depressions in a shaft of resistant materials, sculpted on the length extension of the hand grip and/or handle, in the most convenient position regarding the **ergonomics** of each different type of equipment; also by having a rounded and/or geometric section; by being fit either for right-handed or left-handed persons; by being designed for the use in technical sectors of the industry of sports gear and tooling in general, and by creating in

its set length/section an "anatomic-isobaric body" aimed at making the isobaric distribution of the pressure derived from muscle effort all over the human hand, as it holds the hand grip and/or handle.

- 5 The manufacturing process for the ANATOMIC-ISOBARIC HAND GRIP AND/OR HANDLE is characterized by the sculpting of anatomic prominences and depressions in a shaft of tough material such as: synthetic and/or natural resins, carbon fibers, wood, elastometers, steel, ceramics, fiberglass, conjugate materials, etc....,
- 10 by being such anatomic prominences and depressions sculpted on the extension of the hand grip and/or handle length, in the most convenient position, in ergonomic terms; by featuring a rounded and/or geometric section; by the ability of its manufacturing system to include drilling or lathe-turning, or casting, or injection, in every case
- 15 depending on the type of equipment and material employed; by its coating being rigid and/or flexible, materials being used for that purpose such as leather, elastometers, synthetic and/or natural materials or other materials; by thus creating, in its length/section set, an "anatomic-isobaric body"; also by such "anatomic-isobaric
- 20 body" being moldable through the use of the special single "ring"; finally, by aiming at the isobaric distribution of the pressure derived from muscle effort all over the human hand, as it holds the hand grip and/or handle.

- The position of the "anatomic-isobaric body" in the handles
- 25 of instruments; the measure ratio between its virtual diameter and that of the other segments of the handle, its length and building material, are details which may vary as a function of the specific type of instrument, of more economical manufacturing methods, of the evolution of materials techniques and of the practical experimentation
- 30 of each specific piece of gear. For these reasons, such details are not defined herein.

The "anatomic-isobaric body", which will conform to the classical standards as for sizes, as well as to the ergonomic principles and anatomy of the hand's inner face, shall be placed in the best possible position(s) along the handle, aiming at lowering
5 vibration of the equipment when submitted to reactive forces and at decreasing the physical effort spent by the hand, the forearm, the arm and shoulders of the operator, as he/she strikes with each different sport or work gear, in accordance with the convenience of isobaric effort of the whole hand.

10 The aforementioned special single "ring" is characterized by a special single "ring" manufactured from resistant materials, and which is introduced and adjusted to the hand grip and/or handle already in use or new; by reproducing the same outer shape and the same physical-mechanical effects of
15 the "anatomic-isobaric body"; by such ring being also fixable at any position along the length of the hand grip and/or handle, and also by aiming at the isobaric distribution of the pressure derived from muscle effort all over the human hand, as it holds the hand grip and/or handle.

20 The manufacturing process of a special single "ring" is characterized by the possibility of building it from synthetic and/or natural resins, carbon fibers, elastometers, fiberglass, etc...., by its being manufactured to be introduced and adjusted to the hand grip and/or handle of pieces of equipment already in
25 use; by reproducing the same outer shape and the same physical-mechanical effects of the "anatomic-isobaric body"; by such ring also being fixable at any position along the length of the hand grip and/or handle, by means of pressure, glue, screws, or other devices and, finally, by aiming at the isobaric distribution of the
30 pressure derived from muscle effort all over the human hand, as it holds the hand grip and/or handle.

The utilization of this special single "ring" will give the hand grip and/or handle already in use the same outer shape of the "anatomic-isobaric hand grip and/or handle", according to the drawing in Picture 1.

5 Also, this "ring" may even be built out of a special building material, moldable by pressure of the user's own hand.

This ring will have the advantage of being positioned at any part of a new hand grip and/or handle, satisfying the personal preference of each user of that particular piece of gear, and it will
10 also be supplied as a single item in various standard sizes, to be placed on the handles of equipment already in use. This special single "ring" is an integral part of this Patent of Invention.

The new hand grip and/or handle may have different diameters for its n segments, as shown by the drawing in Picture 1,
15 enclosed.

Picture 1 represents a side view of the new part, covered in flexible and/or non-flexible materials, appropriate for sports or work gear.

In its segment "A", the drawing in Picture 1 represents the
20 hand grip and/or handle with straight, parallel lines, which can also be blunt, as in baseball bats, etc. ...

In segment "B", the hand grip and/or handle features the "anatomic-isobaric body", basic idea of this Patent of Invention.

In segment "N", the hand grip and/or handle features a
25 smaller diameter than that of segment "A", with a gently curving depression, aiming at accommodating the prominence formed by muscles and flexing tendons of the fingers, located at the hand palm base, which allows greater comfort and firmness of hand grip when holding the hand grip and/or handle, so that pressure is made more
30 uniform in the whole of the hand's surface in contact with the hand grip and/or handle.

It is also possible, however, to manufacture this part with equal virtual diameters, both in segment "A" and segment "N".

The "anatomic-isobaric body" shown in segment "B" of the drawing in **Picture 1** is always built in the ideal hand grip position
5 along the hand grip and/or handle of each type of equipment.

As advantages of the technical innovation described herein - the "anatomic-isobaric hand grip and/or handle" [drawing in **Picture 1**] -, the following may be listed:

1. Reduced physical effort when striking;
- 10 2. Substantially reduced vibration of equipment derived from reactive forces;
3. Greater operational safety;
4. Increased strike power for the same physical effort;
- 15 5. Substantially increased control over the instrument;
6. Evenly distributed pressure, all over the user's hand, that is, isobaric pressure.
7. Enhanced confidence of the sports person in
20 the success of strikes.

The "anatomic-isobaric hand grip and/or handle", associated or not to the use of the special single "ring", may be used advantageously in tools or sports instruments or equipment, such as:

- 25 1. Court tennis racquets;
2. Squash racquets;
3. Paddle racquets;
4. Golf clubs;
5. Polo clubs;
- 30 6. Cricket bats;
7. Baseball bats;

- 5
- 10
8. Hockey sticks;
 9. Paddles for boats in general;
 10. Table-tennis bats;
 11. Hammers;
 12. Sledge-hammers;
 13. Knives;
 14. Screwdrivers;
 15. Wrenches;
 16. Electrical hand equipment with hand grips.
 17. Other tools or sports instruments or equipment using hand grip and/or handle.

CLAIMS

- 1: "ANATOMIC-ISOBARIC HAND GRIP AND/OR HANDLE",
characterized by featuring anatomic prominences and depressions in
a shaft of resistant materials, sculpted on the extension of the length
5 of the hand grip and/or handle, in the most convenient position to the
ergonomics of each different type of equipment; also by having a
rounded and/or geometric section; by being fit either for right-handed
or left-handed persons; by being designed for the use in technical
sectors of sports gear and tooling in general, and by creating in its
10 length/section set an "anatomic-isobaric body" aimed at making the
isobaric distribution of the pressure derived from muscle effort all
over the human hand, as it holds the hand grip and/or handle.
- 2: "ANATOMIC-ISOBARIC HAND GRIP AND/OR HANDLE",
according to the 1 Claim,
15 characterized by a special single "ring" manufactured from resistant
materials, and which is introduced and adjusted to the hand grip
and/or handle already in use or new; by reproducing the same outer
shape and the same physical-mechanical effects of the anatomic-
isobaric body, as described in 1st. Claim above; by such "ring" being
20 also fixable at any position along the length of the hand grip and/or
handle, and also by aiming at the isobaric distribution of the pressure
derived from muscle effort all over the human hand, as it holds the
hand grip and/or handle.
- 3: "ANATOMIC-ISOBARIC HAND GRIP AND/OR HANDLE
25 MANUFACTURING PROCESS",
characterized by sculpting anatomic prominences and depressions
in a shaft of tough material such as: synthetic and/or natural resins,
carbon fibers, wood, elastometers, steel, ceramics, fiberglass, various
conjugate materials, or ferrous or non-ferrous materials, etc., by
30 being such anatomic prominences and depressions sculpted and/or
molded on the length extension of the HAND GRIP AND/OR HANDLE,
in the most convenient ergonomic position; by featuring a rounded

and/or geometric section; by the ability of its manufacturing system to include either drilling or lathe-turning, or casting, or injection, or molding, or sculpting, in every case depending on the type of equipment and material employed; by its coating being rigid and/or flexible, materials being used for that purpose such as leather, synthetic and/or natural materials or other materials; by thus creating, in its length/section set, an "anatomic-isobaric body"; also by such "anatomic-isobaric body" being moldable through the use of the special single "ring"; according to the 2 claim above; and, finally, by aiming at the isobaric distribution of the pressure derived from muscle effort all over the human hand, as it holds the hand grip and/or handle.

4: "ANATOMIC-ISOBARIC HAND GRIP AND/OR HANDLE MANUFACTURING PROCESS", according to the 3 claim, characterized by featuring a special single "ring" which may be built from synthetic and/or natural resins, carbon fibers, elastometers, fiberglass, etc..., by being manufactured so as to be introduced and adjusted to the hand grip and/or handle of pieces of equipment already in use; by reproducing the same outer shape and the same physical-mechanical effects of the "anatomic-isobaric body", according to the 3rd. Claim above; by such "ring" being also fixable at any position along the length of the hand grip and/or handle, by means of pressure, glue, screws, or other devices and, finally, by aiming at the isobaric distribution of the pressure derived from muscle effort all over the human hand, as it holds the hand grip and/or handle.

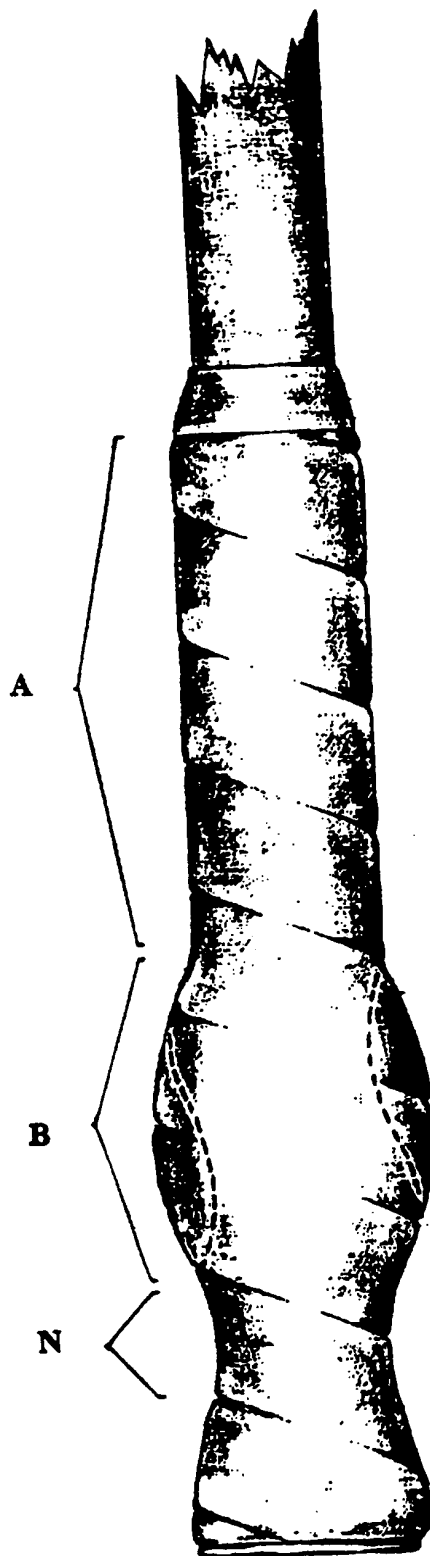


FIG. 1

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER		
IPC ⁶ : A 63 B 49/08, 53/14, 59/06, 59/08, 59/12, 59/16; B 25 G 1/00 According to International Patent Classification (IPC) or to both national classification and IPC		
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EPOQUE, WPI		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 34 14 293 A1 (KLEYLEIN) 24 October 1985 (24.10.85), abstract; fig.1,2; claims 1,2,3,5,10.	1-4
A	DE 37 26 753 A1 (SCHMIDT) 23 February 1989 (23.02.89), fig.9; claim 9.	1-4
A	DE 37 33 425 A1 (SCHMIDT) 16 February 1989 (16.02.89), fig.1,2,9; claims 13,14,17; column 6, lines 27-29.	1,3
A	DE 36 28 618 A1 (BERGER) 19 November 1987 (19.11.87), fig.1; claims 1,2.	1,3
A	US 4 903 691 A (HEINL) 27 February 1990 (27.02.90), abstract; fig.6.	1,3
A	US 4 736 950 A (DOYLE) 12 April 1988 (12.04.88), abstract; fig.5,6.	1,3
A	DE 29 28 995 A1 (CUB, NEUBAUER) 02 April 1981 (02.04.81), fig.1,2; claims 1,2,3; page 3, at the bottom.	1,3
A	US 4 867 444 A (CASTILLO) 19 September 1989 (19.09.89), abstract; fig.1,5,6; claims 1,8,9,17.	1,3
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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 39 24 825 A1 (FREUND GMBH) 31 January 1991 (31.01.91), abstract; fig.1.	1,3
A	US 4 592 109 A (BOREA) 03 June 1986 (03.06.86), abstract; fig.1-3.	1,3
A	WO 94/04 322 A1 (ROUX) 03 March 1994 (03.03.94), totality.	1,3
A	EP 0 330 870 A2 (WERA-WERK WERNER) 06 September 1989 (06.09.89), abstract; fig.1.	1,3
A	US 4 290 465 A (FEE) 22 September 1981 (22.09.81), abstract; fig.1,2,4,5.	1,3

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Information on patent family members

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DE A1 3414293	24-10-85	EP A1 179080 JP T2 61501824 US A 4828261 WO A1 8504592	30-04-86 28-03-86 09-05-89 24-10-85
DE A1 3726753	23-02-89	keine - none - rien	
DE A1 3733425	16-02-89	DE U1 8713289	04-02-88
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US A 4903691	27-02-90	AT E 90543 DE A1 3601715 DE C0 3786182 EP A2 236698 EP A3 236698 EP B1 236698	15-07-93 23-07-87 22-07-93 16-09-87 25-11-87 16-06-93
US A 4736950	12-04-88	keine - none - rien	
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US A 4290465	22-09-81	none	

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